RESEARCH PAPER

A holistic approach of investigating soybean market structure, conduct and performance for strategic insight

*C. DARSHAN AND N. M. KERUR

Department of Agribusiness Management, College of Agriculture, Dharwad
University of Agricultural Sciences, Dharwad - 580 005, India
*E-mail: darshanmalnad159@gmail.com

Abstract: Soybean (*Glycine max*) stands as a globally significant commodity, playing a pivotal role as a primary source for edible oilseeds, vegetable protein, and a foundational raw material for diverse chemical products. This research delves into the intricate dynamics of the soybean market by collecting primary data obtained from market intermediaries, specifically wholesalers and commission agents cum traders. The focus is on market concentration within the selected markets of Bailhongal and Hukkeri in the Belagavi district, chosen for their prominence. Employing a comprehensive approach, this study investigates the market structure, conduct, and performance of soybean markets. Utilizing metrics such as the Lorenz coefficient of inequality and Marketing efficiency index, the research aims to provide valuable insights for stakeholders. Notably, the findings indicate an oligopolistic market structure for soybean, with a Lorenz coefficient of inequality of 0.74 and 0.76 in Bailhongal and 0.77 and 0.779 in Hukkeri markets, for wholesalers and commission agents cum traders respectively. This suggests a concentration of market power in the hands of a few entities in both markets. The price dynamics of soybean are influenced by various factors, including available produce quantity, trader profit margins, and soybean quality, thereby shaping market conduct. Quality assessment primarily revolves around oil and moisture content. The study also identifies differences in the efficiency of marketing channels, highlighting that the first marketing channel demonstrates superior efficiency. Additionally, a comparative analysis reveals that both channels in Bailhongal market exhibit higher efficiency, suggesting better overall market performance in this location. To address prevailing inequalities, the study recommends policy measures directed at stabilizing the market, particularly by reinforcing Agricultural Produce Market Committees (APMCs) and regulating existing marketing practices. These insights aim to guide stake holders and policymakers in enhancing the overall performance and equity within soybean markets.

Key words: Conduct, Lorenz coefficient of inequality, Market structure, Oligopolistic, Performance

Introduction

Agriculture stands as the cornerstone of India's economy, employing more than half of its workforce and contributing approximately 17 per cent to the GDP. The soybean plant (*Glycine max*), also known as soya bean or soja bean, represents an edible seed of global economic significance. It plays a pivotal role in providing vegetable protein to millions and acting as a vital raw material for a multitude of chemical products. Functioning as a leguminous crop, soybean's suitability as an oilseed is counter balanced by challenges in terms of cookability and digestibility, primarily stemming from the presence of trypsin inhibitor. Its growing popularity can be attributed to its adaptable nature across diverse agro-climatic conditions.

Earning the title of a "wonder crop," soybean exhibits exceptional versatility and unparalleled nutritional advantages. Its utility spans various domains, with the production of vegetable oil and margarine constituting significant applications. Soybean oil finds use both in its pure form for salad dressings and in the creation of mayonnaise. This agricultural pursuit is estimated to employ around 6 million individuals within India. As of September 2021, the prospects for soybean cultivation within India displayed encouraging growth and expansion. The nation boasts a noteworthy standing as a key global producer and consumer of soybeans. This crop's cultivation has maintained a steady upward trajectory.

Agricultural marketing plays a multifaceted role extending beyond mere enhancement of productivity and consumption; it serves as an impetus for economic advancement. Its dynamic functions hold pivotal importance in stimulating economic development, thereby earning recognition as a potent driver of agricultural progress. Against this backdrop, endeavours have been undertaken to dissect the market dynamics concerning market structure, conduct and performance in Belagavi district of Karnataka. Studying on market structure, conduct and performance of the selected markets helps to understand the marketing management strategies of soybean in a better way.

Material and methods

The primary data was collected from the selected market intermediaries, specifically wholesalers and commission agents cum traders. The focus is on market concentration within the selected markets of Bailhongal and Hukkeri in the Belagavi district, chosen for their prominence. 10 major wholesalers and commission agents cum traders each were selected randomly to collect the data on their market power, market conduct and performance.

Lorenz coefficient of inequality is the analytical tool used to assess the level of inequality within the marketing system. A higher coefficient suggests a greater degree of inequality, while a lower coefficient indicates a lower level of inequality ranging from 0 to 1.

The purpose of Lorenz coefficient of inequality analysis was to examine the market structure and system of soybean market across various wholesalers and commission agents cum traders involved in the trade. The wholesalers and commission agents cum traders were ranked in ascending order based on the amount of commodities traded and the frequency distribution of different wholesalers, commission agents cum traders and their corresponding business volumes were calculated. The Lorenz coefficient of inequality (L) is given by,

$$L = 1 - \sum_{i=1}^{n} \left(\frac{(x_i - x_{i-1})(y_i + y_{i-1})}{10000} \right)$$

where,

L = The Lorenz coefficient of inequality

x_i = The cumulative per cent of agencies upto i^{th} agency

x_{i-1} = The cumulative per cent of agencies upto $(i-1)^{th}$ agency

y_i = The cumulative per cent of quantity handled upto i^{th} agency

y_{i-1} = The cumulative per cent of agencies upto $(i-1)^{th}$ agency

n = Number of wholesalers or commission agents cum traders

i = Takes value 1, 2, 3, 4,......n

The Lorenz curve is a visual depiction that illustrates the extent of inequality in distribution of business among wholesalers or between commission agents cum traders in a population. It plots the cumulative business at or below each percentile against the corresponding percentiles of the population. Quantity of soybean handled is considered based on the transaction occurred during the last season (2021-22) only.

Marketing efficiency index is the ratio of the net price received by the farmer to the total net margins of intermediaries and total marketing cost. It helps to know the efficiency of the various marketing channels of the soybean with lower marketing costs. It is calculated by using the following formula, which was given by Acharya and Agarwala.

$$MEI = \frac{NP}{MC + MM}$$

where,

MEI = Marketing efficiency Index

NP = Net price received by the farmer

MC = Total marketing cost

MM = Total marketing margin

Results and discussion

Market structure refers to the size and design of the market. It encompasses a collection of market attributes that dictate the economic environment in which a farmer have to operate. Market structure is characterized based on four features. Namely, the number and size distribution of active buyers, sellers and potential new entrants. Concentration of the market power is one of the major factor which influences the market structure. Soybean has oligopolistic type of market structure.

Table 1 depicts the market concentration of market intermediaries in the selected markets which includes also the data on the quantity of soybean handled by selected market. The Lorenz coefficient of inequality for the data was 0.74, 0.76 in Bailhongal market and 0.77 and 0.779 in Hukkeri markets for the wholesalers and commission agents cum traders, respectively, indicating that the market power of soybean' wholesalers is concentrated in the hands of a few, as the coefficient approaches one. The distribution of the soybean quantity among the market intermediaries is highly unequal, as the quantity handling range was from 0.40 per cent (500 tonnes) to 28.31 per cent (35,000 tonnes), 0.52 per cent (500 tonnes) to 37.05 per cent (35,000 tonnes) in Bailhongal market and from 0.31 per cent (300 tonnes) to 28.31 per cent (35,000 tonnes), 0.52 per cent(500 tonnes) to 36.91 per cent (35,700 tonnes) in Hukkeri market with respect to wholesalers and commission agents cum traders, of the respective total volume of 1,23,600 tonnes, 98,200 tonnes, 94,450 tonnes and 96,700 tonnes of soybean. To estimate the Lorenz coefficient of inequality cumulative percentage of quantity handled and cumulative percentage of market intermediaries were calculated after arranging the market intermediaries in the ascending order based on quantity of soybean handled.

The Lorenz curves in fig 1, fig 2, fig 3 and fig 4 illustrates the market power of market intermediaries in the selected market for the year 2021–22. The graphs clearly shows that a small number of market intermediaries control the entire quantity of soybean and their share is distributed very unevenly. The curves are notably far from the line of equality, further emphasizing the significant concentration of market power among a selected few market intermediaries.

This inequality implies that, there is no high competition and also a high level of income inequality among the wholesalers. Similar results were found in the studies carried out by Nzima *et al.* (2014) on the structure, conduct and performance of groundnuts markets in Northern and Central Malawi.

Table 1. Concentration of market power for market intermediaries in the selected markets

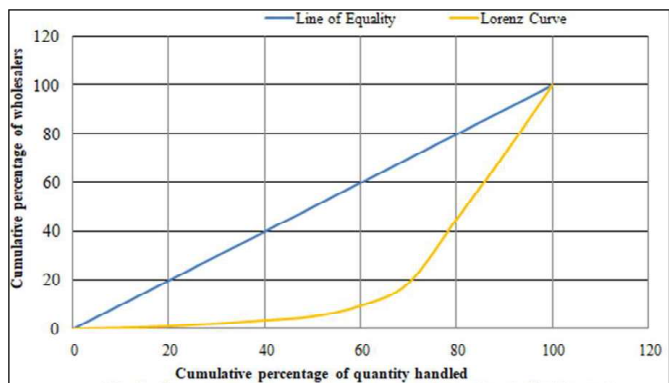| List of Wholesalers/ Commission agents cum traders	Cumulative percentage of Wholesalers/ Commission agents cum traders	Bailhongal Market						Hukkeri Market					
		Wholesalers			Commission agents cum traders			Wholesalers			Commission agents cum traders		
		Qty. handled (tonnes) =A	% of A	Cum. % of A	Qty. handled (tonnes) =B	% of B	Cum. % of B	Qty. handled (tonnes) =C	% of C	Cum. % of C	Qty. handled (tonnes) =D	% of D	Cum. % of D
1	10	500	0.40	0.40	500	0.52	0.525	300	0.30	0.3	300	0.31	0.31
2	20	800	0.64	1.04	800	0.84	1.36	400	0.40	0.7	400	0.41	0.72
3	30	1,350	1.09	2.13	1,350	1.42	2.78	600	0.61	1.31	600	0.62	1.34
4	40	1,700	1.37	3.50	1,700	1.79	4.57	1,200	1.22	2.53	700	0.72	2.06
5	50	2,000	1.61	5.11	2,000	2.11	6.68	1,200	1.22	3.75	1,200	1.24	3.30
6	60	5,500	4.44	9.55	3,000	3.17	9.85	1,800	1.83	5.58	1,800	1.86	5.16
7	70	11,600	9.38	18.93	5,500	5.82	15.67	6,400	6.51	12.09	5,400	5.58	10.74
8	80	32,150	26.01	44.94	11,600	12.28	27.95	22,000	22.40	34.49	22,000	22.75	33.49
9	90	33,000	26.69	71.63	33,000	34.93	62.88	28,600	29.12	63.61	28,600	29.57	63.06
10	100	35,000	28.31	100	35,000	37.05	100	35,700	36.35	100	35,700	36.91	100
TOTAL	1,23,600	100		94,450	100		98,200	100		96,700	100		
Lorenz coefficient of inequality	0.74			0.76				0.77			0.779		

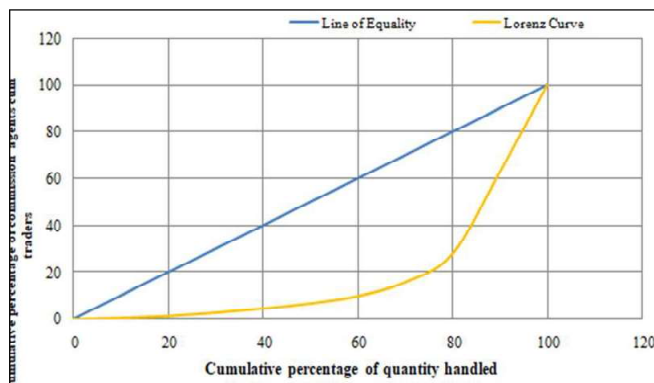Fig. Lorenz curve for market power of wholesalers in Bailhongal market

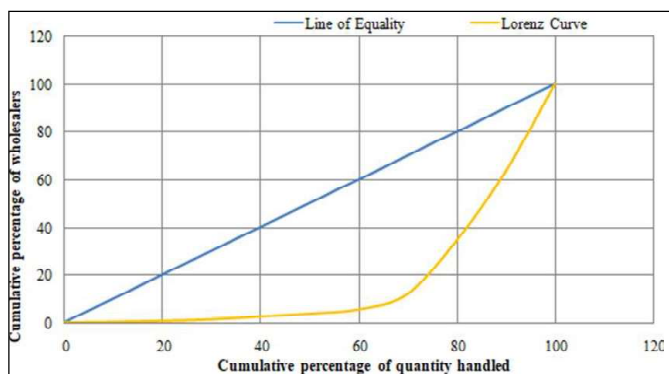Fig 2. Lorenz curve for market power of commission agents cum traders in Bailhongal market

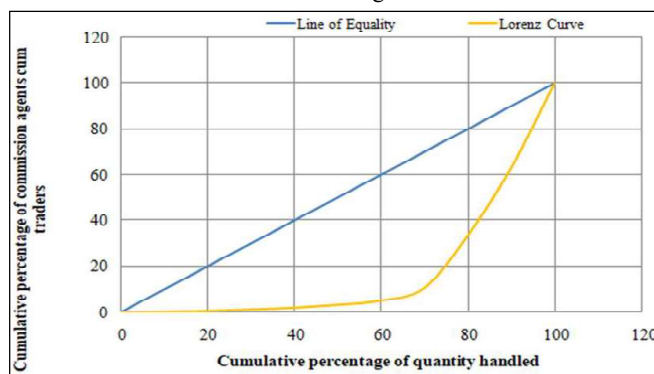Fig3. Lorenz curve for market power of wholesalers in Hukkeri market

Fig 4. Lorenz curve for market power of commision agents cum traders in Hukkeri market

Market conduct refers to the manner in which traders and other participants in the market engage and adapt to the dynamics of the buying and selling processes. It encompasses the actions and strategies employed by individuals to influence or respond to market conditions, encompassing behaviours such as establishing prices and engaging in buying and selling transactions.

Table 2 shows the information on the market conduct persisting in the soybean market, along with its corresponding effects on the market.

The price of soybean is determined based on several factors, including the quantity of produce available, the profit margins given to different traders and the quality of the produce. The quality of soybean is assessed based on its oil and moisture content, which likely impacts the price and marketability of the produce. Market intermediaries use two main methods of payment. Approximately 28.33 per cent of the market intermediaries conduct the transactions through cash, while 71.67 per cent of the market intermediaries conduct

the transactions through a combination of both cash and online payments. The soybean market primarily operates through a closed tendering system, where buyers place bids for the produce. This method is the exclusive approach used in all transactions (100%). Intermediaries universally utilize electronic weigh bridges (100%) to accurately measure and record the weight of soybean during transactions in both the selected markets Food processors in the market offer higher and more remunerative prices for soybean of better quality, incentivizing farmers to produce high-quality produce. Some wholesalers (21%) in the market provide financial support to farmers, in the form of post-sale financing. The majority of farmers (86.66%) sell their soybean produce within 15 days after harvest, reflecting a relatively quick turnover of the commodity in the market.

Overall, the Table 2 highlights the various practices and conduct of market intermediaries in the soybean market, along with their effects on the pricing, quality assessment, payment methods and support offered to farmers. This information provides insights into

Table 2. Market conduct persisting in the soybean market

Elements of market conduct	Effect on soybean market
Price setting behaviour	Price fixed based on arrivals of the produce, margins given to different traders and the quality of the produce.
Specification of the quality of the produce	Oil and moisture content
Methods of payment	Cash (28.33%), Both cash and online payments (71.67%)
Method of sale	Closed tendering system (100%)
System of weighments	Through electronic weigh bridges (100%)
Practices adopted by the food processor in procurement	Providing high and remunerative price for the quality produce
After sales support	Providing finance to farmers by certain wholesalers (21.66%)
Time of sale of the produce by the farmers	Within 15 days after harvest (86.66% of the farmers)

Table 3. Factors influencing the market performance in the selected markets

Particulars	Bailhongal Market	Hukkeri Market
No. of wholesalers registered	109	52
No. of commission agents cum traders registered	75	27
No. of wholesalers dealing with soybean in particular	13	11
No. of commission agents cum traders dealing with soybean mainly	11	14
Market fee collected from soybean (₹) trading in FY 2020-21	1,45,755	4797
Total value of soybean' trade in FY 2020-21 (Lakh)	11,100.96	799.5

Table 4. Marketing efficiency index across various marketing channels and in selected markets (₹ /Qtl.)

Particulars	Bailhongal Market		Hukkeri Market	
	Channel I	Channel II	Channel I	Channel II
Net price received by the soybean producer	4820	4203	4800	4215
Final price paid by consumer	5500	5839	5500	5864
Total Marketing Costs	680	1551	700	1559
Total Marketing Margins	-	85	-	90
Marketing Efficiency Index	7.08	2.56	6.85	2.55

the dynamics and functioning of the soybean market. The market conduct and practices of intermediaries in the soybean market seem to be focused on effciency, quality assurance and offering support to farmers. The use of technology, like electronic weigh bridges and digital payments, enhances transparency and reduces transactional inefficiencies. Additionally, the focus on quality incentivizes farmers to produce better soybean, benefiting both buyers and sellers in the market. Similar findings were found in the studies made by Nzima *et al.* (2014) on the structure, conduct and performance of groundnuts markets

Market performance encompasses the degree to which markets yield desirable outcomes that align with societal preferences. It denotes the effectiveness of markets in meeting specific social and individual goals, encompassing factors such as price levels and stability over both short and long durations, profitability, expenses, efficiency and the volume and quality of food commodities transacted.

Marketing efficiency is one of the major factor which influences the market performance. Here, in this context, study on marketing efficiency indicated by a index across various marketing channels and markets was conducted. Table 3 provides information on various factors influencing the market performance in the Bailhongal and Hukkeri markets.

Bailhongal market has 109 registered wholesalers (13 mainly dealing with soybean) and 75 registered commission agents cum traders (11 mainly dealing with soybean) , whereas Hukkeri market has 52 registered wholesalers (11 mainly dealing with soybean) and 27 registered commission agents cum traders(14 mainly dealing with soybean).

Bailhongal market collected ₹ 1,45,755 (in FY 2020-21) as market fees from soybean trading during the fiscal year 2020-21, whereas in Hukkeri market 4,797 was collected as market fees for the same period. The value of soybean trade in Bailhongal market was significantly higher at 11,100.96 lakhs in the financial year 2020-21 compared to Hukkeri market, which recorded 799.5 lakhs in soybean trade.

To determine which market has good performance, we need to consider the factors collectively. Generally, a market with a higher number of registered wholesalers and commission agents cum traders, along with a larger value of trade, indicated better performance. Based on these criteria, the Bailhongal market seems to have better performance than the Hukkeri market. Bailhongal has a higher number of registered wholesalers and commission agents cum traders and also conducts significantly higher trade value in soybean compared to Hukkeri. Table 4 depicts the marketing efficiency indices across the two identified marketing channels in the selected markets.

The marketing efficiency index for the Bailhongal Market was 7.08 and 2.56 in the first and second channels in Bailhongal market and 6.85 and 2.55 in the first and second channels in the Hukkeri market respectively. Thus, the first marketing channel was relatively efficient in marketing of soybean comparatively and among the two markets both the channels of Bailhongal market were found to be efficient indicating that the Bailhongal market has relatively good market performance comparatively. Obtained results were in line with the findings of Jorwar *et al.* (2018) on chilli production and marketing in Amravati district of Maharashtra.

Conclusion

The identified market dynamic nuances hold implications for future agricultural strategies and policies within the region. Soybean being the "wonder crop" due to its remarkable versatility and incredible nutritional benefits. The market power of soybean' wholesalers and commission agents cum traders is concentrated in the hands of a few in both the markets, as the coefficient approaches one and the soybean has the oligopolistic type of market structure. The price of soybean in the market is influenced by multiple factors, including the quantity of available produce, profit margins given to traders and the quality of the soybean, which in turn determines the market conduct and the marketing channel with less or no market intermediaries was efficient comparatively. Required policy measures are to be directed to stabilize the prevailing inequality, *viz.*, strengthening APMCs and regulating the existing marketing practices.

Refrences

Jorwar R M, Sarap S M and Chavan V U, 2018, Economics of Production and Marketing of Chilli in Amravati district. *Journal of Pharmacognosy and Phytochemistry*, 7(2):310- 316.

Nzima W M, Dzanja J and Kamwana B, 2014, Structure, conduct and performance of groundnut markets in Northern and Central Malawi: Case studies of Mzimba and Kasungu Districts. *International Journal of Business and Social Science*, 5(6).